Geomorphic data that corroborate the map data can be found in the occurrence of a series low relief, vegetated marsh islands (Fig. 1) within the tidal marsh (locally known as Dudley Island) that backs the contemporary flood tidal delta. The lack of comparable marsh islands in the bar-built lagoon that back Bear Island and Bogue Banks suggest the inlet has been relatively stable for many centuries. (Cleary and Hosier 1979; Hosier and Cleary, 1982)

Aerial Photograph Data

Inlet minimum width and baseline width

Bogue Inlet is a large inlet compared to the majority of other inlets within southeastern North Carolina. The inlet's minimum width and the inlet's width measured along the baseline were used as standards of comparison for the photographic analyses. The former inlet parameter by convention is measured within the inlet throat at the narrowest point between the wet/dry lines on the adjacent shoulders. The inlet's minimum width (IMW) has varied considerably during the past seven decades from a minimum of 2,100 ft (1938) to a maximum of 5,025 ft (1993) (Backstrom, 2000). A previous study by CS & E (2001) reported the inlet's minimum width (throat width) varied from approximately 2,430 ft in April 1938 to a maximum of 6,355 ft in August 1976.

During the time period covered by this study, the IMW ranged from 6,006 ft in 1976 to a minimum of 1,586 ft in February 1984. The baseline inlet width, measured seaward of the narrowest portion of the inlet, has varied considerably. Since 1973 the baseline width has ranged from a minimum of 4,439 ft to a maximum of 8,383 ft in September 2001 (Fig. 3 and Fig. 1, Appendix). The width of the ebb channel along the baseline reached a minimum of 302 ft in February 1984 and its maximum value of 1,134 ft in September 1981. The changes recorded reflect expansion and constriction associated with storms, and realignment of the ebb channel and the subsequent spit development on one or both shoulders. Since the early 1980s there has been a general widening of the throat. The rapid change and large variation in the various width parameters has been attributed to the morphologically immature nature of the inlet system (CS &

E, 2001). Most unmodified inlets in southeastern North Carolina display these trends that reflect the changing roles of the open ocean and backbarrier factors that control the morphology of the systems.

Ebb channel orientation

The main ebb channel that links the ocean and the lagoon and separates the adjacent islands is termed the ebb channel. It is comprised of several major segments. The deeper segment of the ebb channel (12- 24 ft), located between Bogue Banks and Bear Island (Hammocks Beach), is defined as the throat section. The seaward-portion of the ebb channel, which extends across the ebb shield, is referred to as the outer bar or ebb platform channel. The azimuth of the axis of the ebb channel (Fig. 4 and Fig. 1, Appendix) was measured at the point where it crosses the zone of breaking waves (terminal lobe as defined by Hayes, 1980). The orientation of the outer bar channel can be a very important inlet parameter because slight changes in the alignment can have a major impact on the erosion of the adjacent shoreline.

Orientation and position of this channel segment have changed repeatedly over time (Fig. 4 and Fig. 1, Appendix). Over the past four decades the orientation of the outer bar channel has ranged from 143^0 in February 1984 to 185^0 in March 1999. The movement and orientation of this channel segment coupled with the migration of the landward segments of the channel have dictated much of the contemporary and historic shoreline change patterns along both shoulders and oceanfront shorelines. Figure 4 illustrates the position and orientation of the various segments of the ebb channel since between 1973 and 2001.

Inspection of the data (Fig. 4 and Fig. 1 B, Appendix) show that from 1973 to 2001, the outer bar channel has generally been aligned in a SE to S orientation (143-185^o) during the past 28 years. During the past decade the orientation of the outer bar channel has changed by as much as 35^o. Complex wave and current interactions that occur along the margins of the outer bar channel and the adjacent terminal lobe and swash platforms control the channel alignment. The position and orientation of the outer bar channel control the shape of the terminal lobe and the

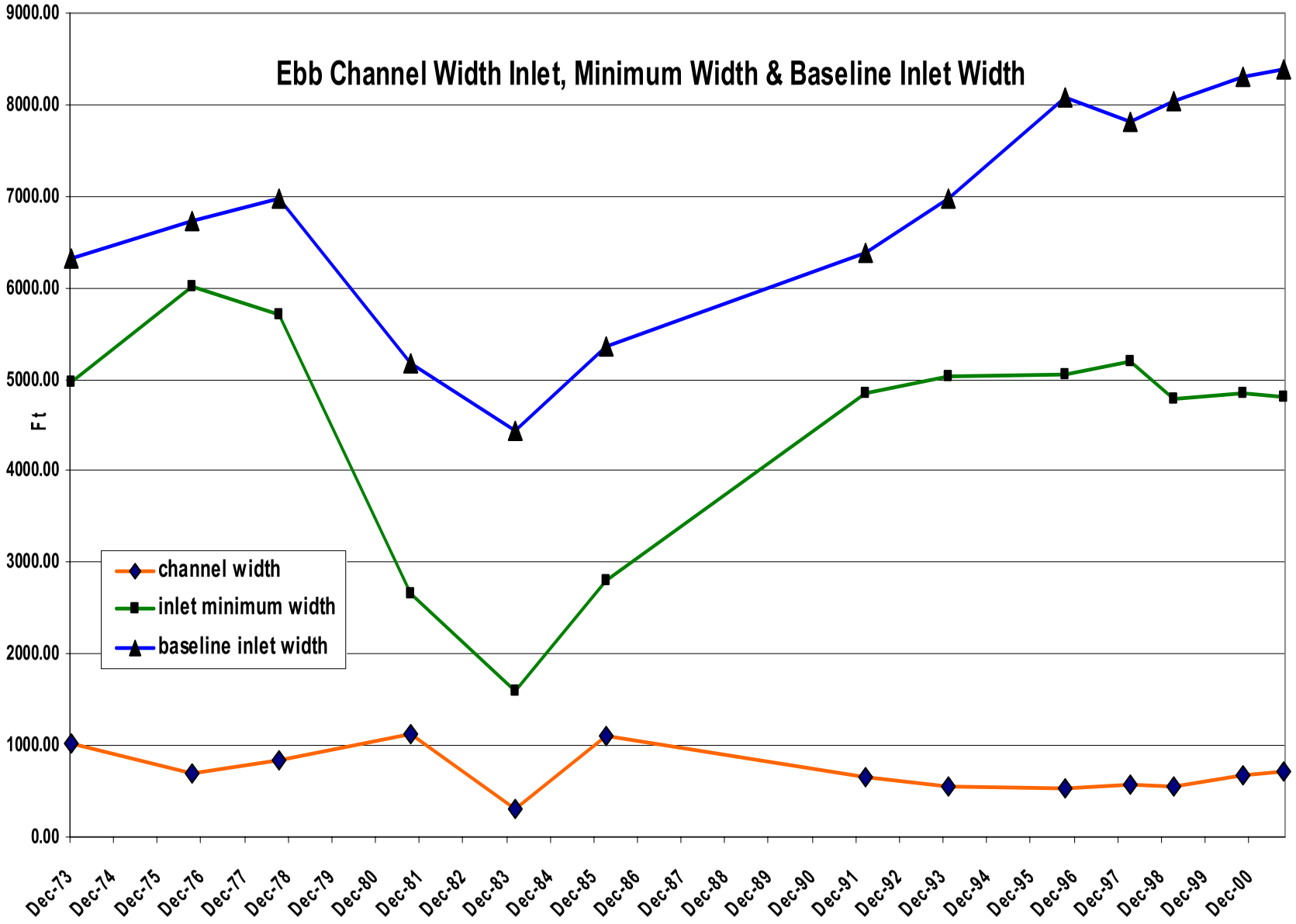

Figure 3. Graph depicting changes in baseline inlet width, ebb channel width, inlet minimum width (IMW). Insert table lists ebb channel azimuth (outer bar channel orientation) between December 1973 and September 2001.

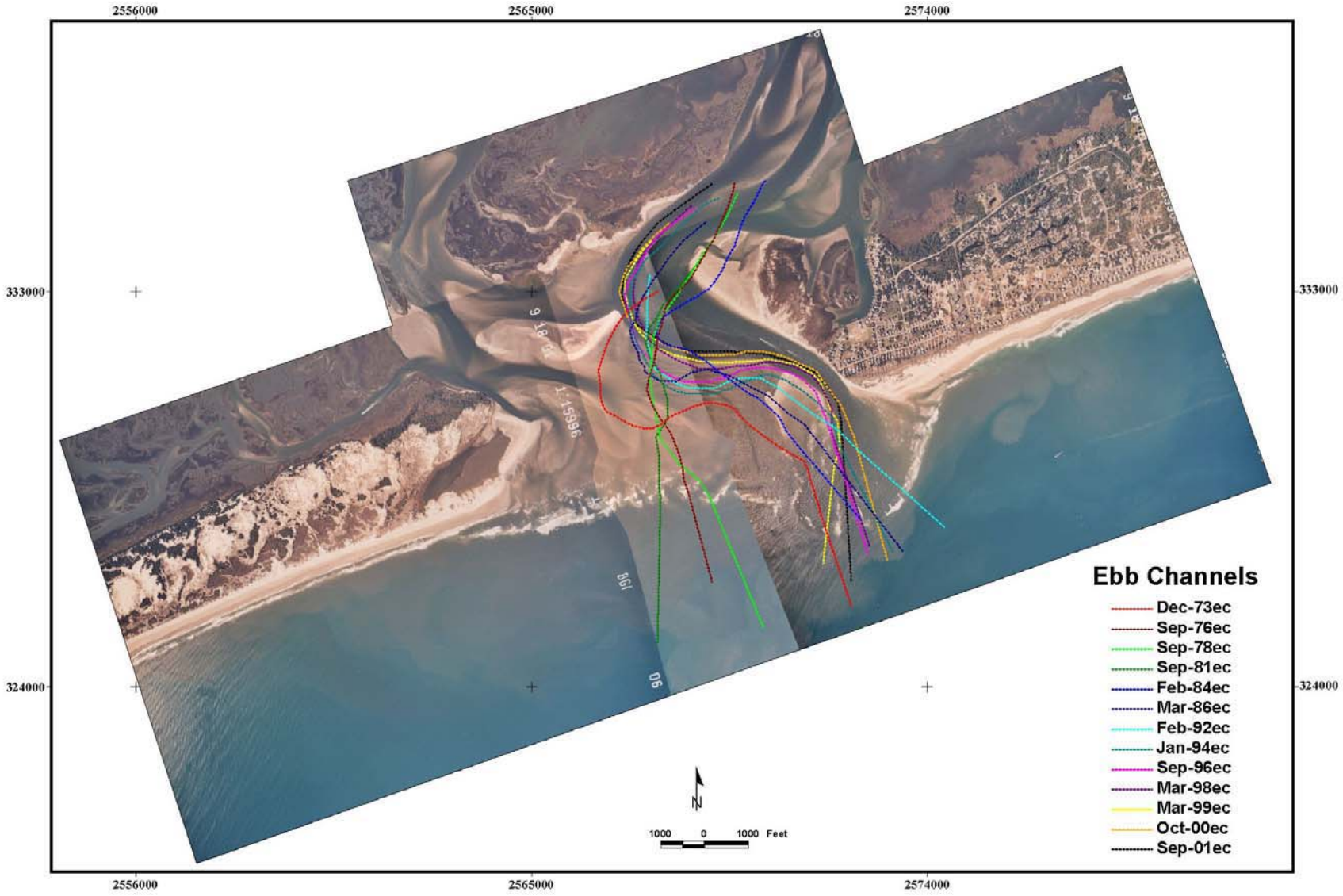

Figure 4. Aerial photograph mosaic (9/18/00) showing ebb channel positions between December 1973 and September 2001. Insert table lists azimuths for outer bar channel (ebb channel).